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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/633,255      | 08/01/2003  | John Patrick Sterchi |                     | 4781             |

27189 7590 03/27/2006

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EXAMINER

WILLS, MONIQUE M

ART UNIT PAPER NUMBER

1746

DATE MAILED: 03/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |                                       |  |
|------------------------------|--------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/633,255 | <b>Applicant(s)</b><br>STERCHI ET AL. |  |
|                              | <b>Examiner</b><br>Monique M. Wills  | <b>Art Unit</b><br>1746               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/1/03</u> . | 6) <input type="checkbox"/> Other: _____  |

DETAILED ACTION

*Information Disclosure Statement*

The information disclosure statements filed August 1, 2003 has/have been received and complies with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. Accordingly, the information disclosure statement(s) is/are being considered by the examiner, and an initial copied is attached herewith.

*Claim Rejections – 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

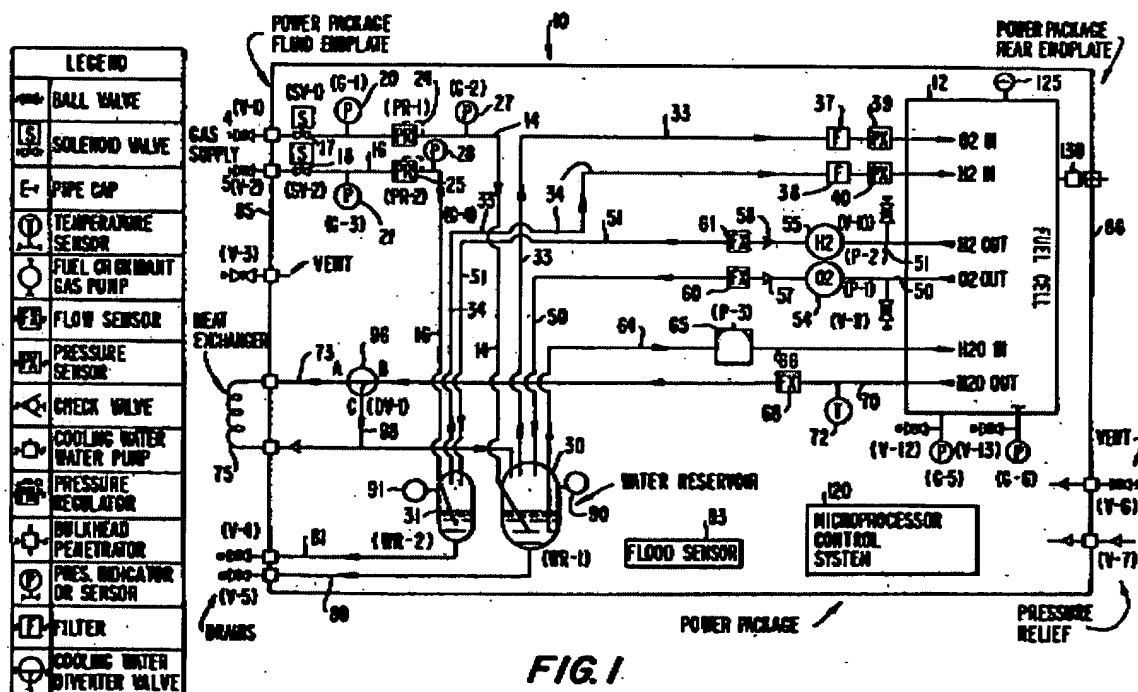
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,2 & 5 are rejected under 35 U.S.C. 103(a) as being obvious over Perry, Jr. et al. U.S. Patent 5,192,627 in view of Raiser U.S. Pub. 2002/0064695.

With respect to claim 1, Perry teaches a method of replenishing hydrogen in a hydrogen fuel cell stack, comprising: providing a source of hydrogen for the hydrogen fuel cell stack (col. 4, lines 20-30); providing a hydrogen fuel cell stack having an inlet (66) for the introduction of hydrogen and an outlet (51) for

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the removal of hydrogen (col. 7, lines 1-10); providing a hydrogen delivery and recovery sub-system for supplying hydrogen to the inlet of the hydrogen fuel cell stack and recovering unused hydrogen from the outlet of the hydrogen fuel cell stack, the hydrogen delivery and recovery sub-system including a pump to pump hydrogen through the hydrogen delivery and recovery sub-system and hydrogen fuel cell stack (col. 5, lines 20-25); supplying hydrogen to the hydrogen delivery and recovery sub-system with the source of hydrogen (col. 5, lines 1-25); pumping hydrogen through the hydrogen delivery and recovery sub-system to and from the hydrogen fuel cell stack using pump (54,55).



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With respect to claim 5, Perry teaches a logic control system (controller) to regulate the hydrogen recycle loop (col. 6, lines 45-50).

Perry does not expressly disclose a hermetically sealed regenerative pump to pump hydrogen throughout the system (claim 1). The reference is silent to an inner chamber to balance the pressure between an inside of the passages with the relief hole and inner chamber (claim 2) and a current controller to set and maintain the current of the motor (claim 5).

However, Raiser teaches the equivalence of recirculation pumps and side channel blowers (hermetically sealed regenerative pumps) in hydrogen circulation systems for fuel cells. See paragraph 59.

Therefore, although Perry discloses a recirculation pump instead of a regenerative pump, Raiser shows that a recirculation pump is an equivalent structure known in the art. Therefore, because these two pumps were art recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute the regenerative pump for the recirculation pump.

With respect to claim 2, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ a relief hole to balance the pressure between the inside of one or more passages of the pump, in order to greatly reducing the amount of fluid.

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With respect to claim 5, Perry teaches a logic control system that receives sensory data and manages the closed loop system (col. 6, lines 35-65). However, the reference does not expressly disclose using the controller to maintain the current of the motor to run at a constant power level. Nonetheless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to control the current of the motor to run at a constant power level, since it has been held that broadly proving mechanical or automatic means to regulate an actively involves only routine skill in the art. In re Venner, 120 USPQ 192.

*Claim Rejections – 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being obvious over Perry, Jr. et al. U.S. Patent 5,192,627 in view of Raiser U.S. Pub. 2002/0064695 and further in view of Siepierski et al. U.S. Pub. 2003/0077499.

Perry in view of Raiser teaches a method of replenishing hydrogen in a hydrogen fuel cell stack as described in the § 103 (a) rejection recited hereinabove.

However, Perry is silent to the regenerative pump including an impeller, a motor with a rotating shaft to rotate the impeller, and an anti-rotation mechanism to prevent the shaft from rotating relative to the impeller.

Siepierski teaches that it is conventional to employ a pump with a motor (164), rotating a stator (166) and bearings (170) that function as anti-rotation mechanism for the shaft.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ impeller/motor/shaft arrangement of Siepierski in the hydrogen replenishing system of Perry, because Siepierski teaches that the arrangement enables makeup hydrogen in the motor portion of the assembly at a pressure greater than the pressure in the blower portion of the assembly. As a result, some of the make-up hydrogen flows from the motor portion of the assembly into the blower assembly, which helps prevent components in the re-circulation loop from entering the motor portion of the assembly. See Paragraph 10.

*Allowable Subject Matter*

Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 4 would be allowable over the prior art of record, because the prior art is silent to the impeller including an incurved channel and the shaft including an incurved channel alienable with each other to form a bore, and the anti-rotation mechanism including a rod disposed in the bore formed by the aligned incurved channels of the impeller and the shaft.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Michael Barr, may be reached at 571-272-1414. The fax

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phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MW

3/18/06

A handwritten signature in black ink, appearing to read 'Michael Barr', with a stylized flourish extending from the end.

**MICHAEL BARR**  
**SUPERVISORY PATENT EXAMINER**